

Date: Wednesday, 07/01/2009 10:30:41 AM
 User: Julie Dawson

Process Sheet

Customer : CU-DAR001 Dart Helicopters Services	Drawing Name : 350/355 AS X-TUBE AFT
Job Number : 44436	
Estimate Number : 12486	
P.O. Number :	Part Number : D350748201
This Issue : 07/01/2009 S.O. No. :	Drawing Number : N/A
Prsht Rev. : NC	Project Number : N/A
First Issue : / / Type : CROSSTUBES	Drawing Revision : D
Previous Run : 43518	Material :
Written By :	Due Date : 30/01/2009 Qty: 1 Um: Each
Checked & Approved By : <u>JLD 09.01.07</u>	
Comment : Est Rev: A New Issue 06-07-05 JLM Est Rev: B Update qty of MS21042L5 06-09-12 KJ Est Rev: G Combined manufacturing 08.04.02 EC verified by: DD Est Rev: D 08-06-24 revD as per dwg DD verified by: EC Est Rev: E 08.12.11 Step17 was step 21 KJ Verified by:	

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
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1.0	DC	DOCUMENT CONTROL
-----	----	------------------



C209/03/25



Comment: Photocopy bluefile & type labels per PPPD350-748-201	CHG001
--	--------

S 02/07/05

2.0	D350748241TRN	Crosstube Turning Detail
-----	---------------	--------------------------



Comment: Qty.: 1.0000 Each(s)/Unit	Total: 1.0000 Each(s)
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CROSSTUBE TURNING DETAIL

batch 40414 from scrapped w/o see attached

P70

3.0	BENDING	BENDING MACHINE - SKIDTUBES
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**Comment:** BENDING MACHINEBend tube as per Dwg D350-748-241 using CNC bender program D350A and Folio FT 9-2-12

4.0	QC15	DIMENSIONAL CHECK OF X-TUBES
-----	------	------------------------------

**Comment:** DIMENSIONAL CHECK OF X-TUBES

J 09.02.17 (1)

5.0	CROSSTUBES	CROSSTUBES RESOURCE 1
-----	------------	-----------------------

**Comment:** LANDING GEAR RESOURCE 1

1-Remove all marks from tube within limits of D350-748-241

2-Drill Tube as per Dwg D350-748-241 Using DT8876 Drill Jigs,



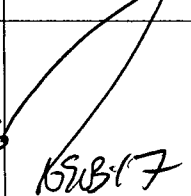


Set-up drill table as per QSI 010

- AWM 9-2-18
Jm 09-02-17

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D350-748-201 PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR: <u>44436</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
09.2.17	2	0.019 DEEP DENT X 0.25" LONG X 8-3.0" FROM END OF CLIFF AFTER BONDING, DENT IS AT 45° ON TUBE. 		ACCEPTABLE TO POLISH OUT DENT AND CARRY ON WITH PRODUCTION	AWM 9-3-16	 SUB:17	 09.02.12	 09.02.17

NOTE: Date & initial all entries

Date: Wednesday, 07/01/2009 10:30:41 AM
User: Julie Dawson

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 350/355 AS X-TUBE AFT

Job Number: 44436

Part Number: D350748201

Job Number:



Seq. #:

Machine Or Operation:

Description :

3-Deburr

4-Engrave Part # and Batch # as per Dwg D350-748-241

fm' 09-02-17

6.0

QC6

DIMENSIONAL CHECK



Comment: DIMENSIONAL CHECK

7.0

OUTSIDE SERV.10

OUTSIDE SERVICES -skids



Comment: Sub-Contracting OUTSIDE SERVICES

Issue P/O: 2213

Stress relief at 375° for 5 hours

Magnetic Particle Inspect per ASTM E1444

Cadium Plate per AMS-QQ-P-416B, Class 1, Type 2

Embrittle relief at 375° for 8 hours, Chromate Treat

Possible Supplier: Southwest United Industries

Ensure Certificate of Conformity is attached

CL09/02/18

①

8.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Receive & Inspect For Transit Damage

Ensure certificate of conformity is attached

09/03/12

9.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

090312②

10.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside crosstube as per QSI 005 4.2

2-Paint Outside of Tube as per Dart QSI 005 4.2

27 09-03-12

11.0

QC14

INSPECT SPRAY PAINT



Comment: Inspect Spray Paint

Then, Wrap in plastic bag to protect from scratches

MA 090318 ①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 07/01/2009 10:30:41 AM
User: Julie Dawson

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 350/355 AS X-TUBE AFT

Job Number: 44436

Part Number: D350748201

Job Number:



Seq. #:	Machine Or Operation:	Description :
---------	-----------------------	---------------

12.0	D2856400	Abraison Strip
------	----------	----------------



* Comment: Qty.: 1.2401 f(s)/Unit Total: 1.2401 f(s)
Abrasion Strip 7.10" long x2
Batch: 36398

RT 09-07-18

13.0	ALS41032225	Insert
------	-------------	--------



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)
Insert
Batch: 19393

RT 09-03-18

14.0	AN960JD10	Washer
------	-----------	--------



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)
Washer
Batch: 110523

RT 09-03-18

15.0	MS2192020	Clamp (per MIL-DTL-8783C)
------	-----------	---------------------------



* Comment: Qty.: 2.0000 Each(s)/Unit Total: 2.0000 Each(s)
Clamp (per MIL-DTL-8783C)
Batch: 110451

RT 09-03-18

16.0	MS27039110	Screw
------	------------	-------



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)
Screw
Batch: 110704

RT 09-03-18

17.0	D35021	Support
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Comment: Qty.: 2.0000 Each(s)/Unit Total: 2.0000 Each(s)
SUPPORT
Batch: 41603

RT 09-03-18

18.0	CROSTUBES	CROSTUBES RESOURCE 1
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Comment: LANDING GEAR RESOURCE 1

1-Install Ground wire Insert, then insert screw and washer

2-Install Abrasion strips as per Dwg D350-748-241 & QSI 035.

RT 09-03-18

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 07/01/2009 10:30:41 AM
User: Julie Dawson

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 350/355 AS X-TUBE AFT

Job Number: 44436

Part Number: D350748201

Job Number:



Seq. #:

Machine Or Operation:

Description :

3-Install supports Using Dt8876 as per Dwg D350-748-241, Torque to 60-80 IN-LBS

7T 09-03-18

19.0

QC5

INSPECT WORK TO CURRENT STEP

S



INSPECTED FOR TRUST BY IT/DS



09.03.24

Comment: INSPECT WORK TO CURRENT STEP

- inspect for ASS.

5/3/24 @

20.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Pick Packing Kit

21.0

D35001

Saddle

S



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

350 SADDLE

Batch: B45668

9/3/25

SD

22.0

D35011

Bushing

S



Comment: Qty.: 16.0000 Each(s)/Unit Total : 16.0000 Each(s)

BUSHING

Batch: B39726

CY

23.0

AN46A

Bolt

S



Comment: Qty.: 16.0000 Each(s)/Unit Total : 16.0000 Each(s)

Bolt

Batch: M110399

CY

24.0

AN441A

bolt

S



Comment: Qty.: 8.0000 Each(s)/Unit Total : 8.0000 Each(s)

bolt

Batch: M109068

CY

25.0

AN532A

Bolt

S



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Bolt

Batch: M110363

CY

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 07/01/2009 10:30:41 AM
User: Julie Dawson

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 350/355 AS X-TUBE AFT

Job Number: 44436

Part Number: D350748201

Job Number:



Seq. #:

Machine Or Operation:

Description :

26.0

AN960JD416

Washer



CY

Comment: Qty.: 32.0000 Each(s)/Unit Total : 32.0000 Each(s)

Washer

Batch: m110363

27.0

AN960JD516

Washer



CY

Comment: Qty.: 8.0000 Each(s)/Unit Total : 8.0000 Each(s)

Washer

Batch: m110523

28.0

MS21042L4

Nut



CY

Comment: Qty.: 24.0000 Each(s)/Unit Total : 24.0000 Each(s)

Nut

Batch: m109282

29.0

MS21042L5

Nut



CY 09/03/25

Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Nut

Batch: m110382

30.0

QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

09/03/25 (X)

31.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and pack for shipping as per PPP D350-748-201

Location: _____

PPP Rev: _____

Rev A

09/03/25 (X)

32.0

QC21

FINAL INSPECTION/W/O RELEASE



09/03/25

Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



mf
09-03-26

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

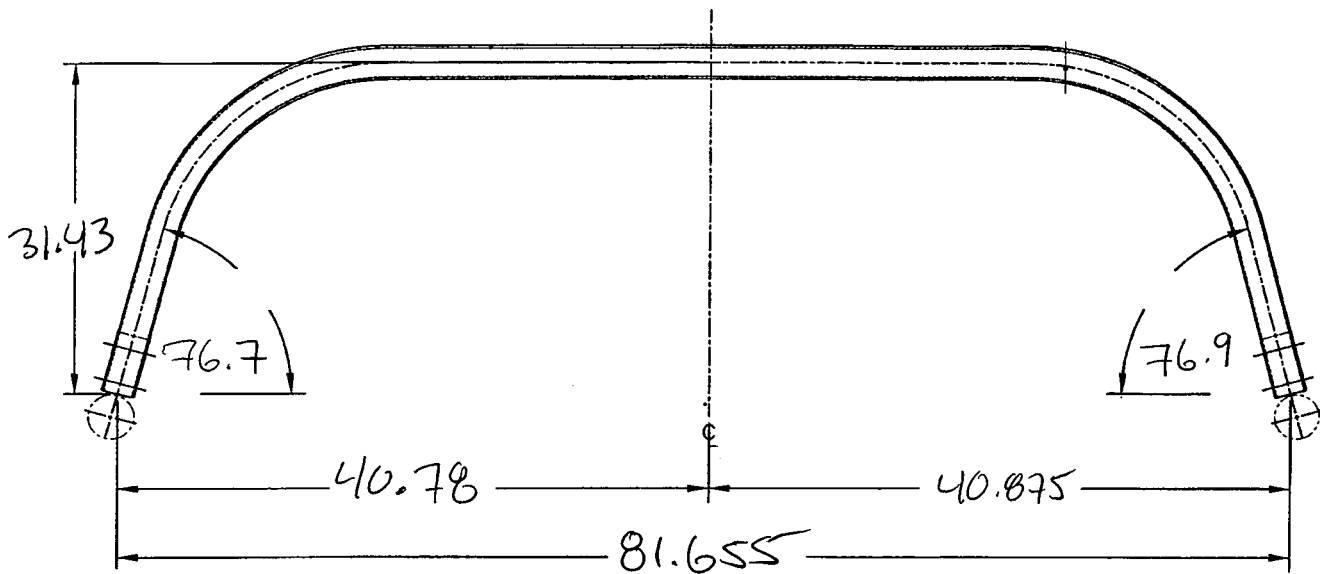
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	H4436
Description: Crosstube High Aft (AS350/355)		Part Number:	D350-748-201
Inspection Dwg: D350-748-241 Rev: D		Page 1 of 1	

Required Dimension	Min	Max
Height	31.22	31.48
1/2 Span	40.77	41.03
Angle	75	77
Total Span	81.54	82.06



Comments
Tube sits flat from RH to LH.
MAX TWIST = 0.075" ACCEPTABLE #09.09.24

QC15 Inspection	
Date	09.02.17

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	

DART**RELEASED**

06.10.31

DESIGN <i>92</i>	DRAWN BY <i>92</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D350-748-241	REV. D SHEET 1 OF 3
DATE 06.10.31		TITLE CROSSTUBE (AS 350/355 HI AFT)	SCALE NTS
A	06.03.31	NEW ISSUE	
B	06.06.30	ADD D6018-125 & PRIME AND PAINT	
C	06.08.14	ADD CAD PLATING	
D	06.10.31	MAG. PARTICLE AND CAD PLATE AS MFD.	

QTY	P/N	DESCRIPTION
X	D350-748-241	CROSSTUBE ASSEMBLY (AS 350/355 HI AFT)
1	D6018-125	CROSSTUBE (OR D6015-125)
2	D3502-1	SUPPORT
2	D2856-400-710	ABRASION STRIP
1	AELS-1032-225	INSERT
1	AN960JD10	WASHER
2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
1	MS27039-1-10	SCREW

D350-748-141 CROSSTUBE:

- 1) MATERIAL: MANUFACTURED FROM D6018-125 OR D6015-125
FINISHED LENGTH = 122.70±0.06
- 2) MACHINE PER MACHINING DETAIL ON PAGE 3. BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITIONS SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 3) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 4) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 5) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING
- 6) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 7) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 8) INSTALL D2856-400-710 ABRASION STRIP WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 9) TORQUE MS21920-20 CLAMPS 60 TO 80 IN-LB
- 10) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 11) ALL DIMENSIONS ARE IN INCHES
- 12) PART IS SYMMETRIC ABOUT CENTERLINE EXCEPT FOR Ø0.297 HOLE.

RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
122436

UNDER REVIEW

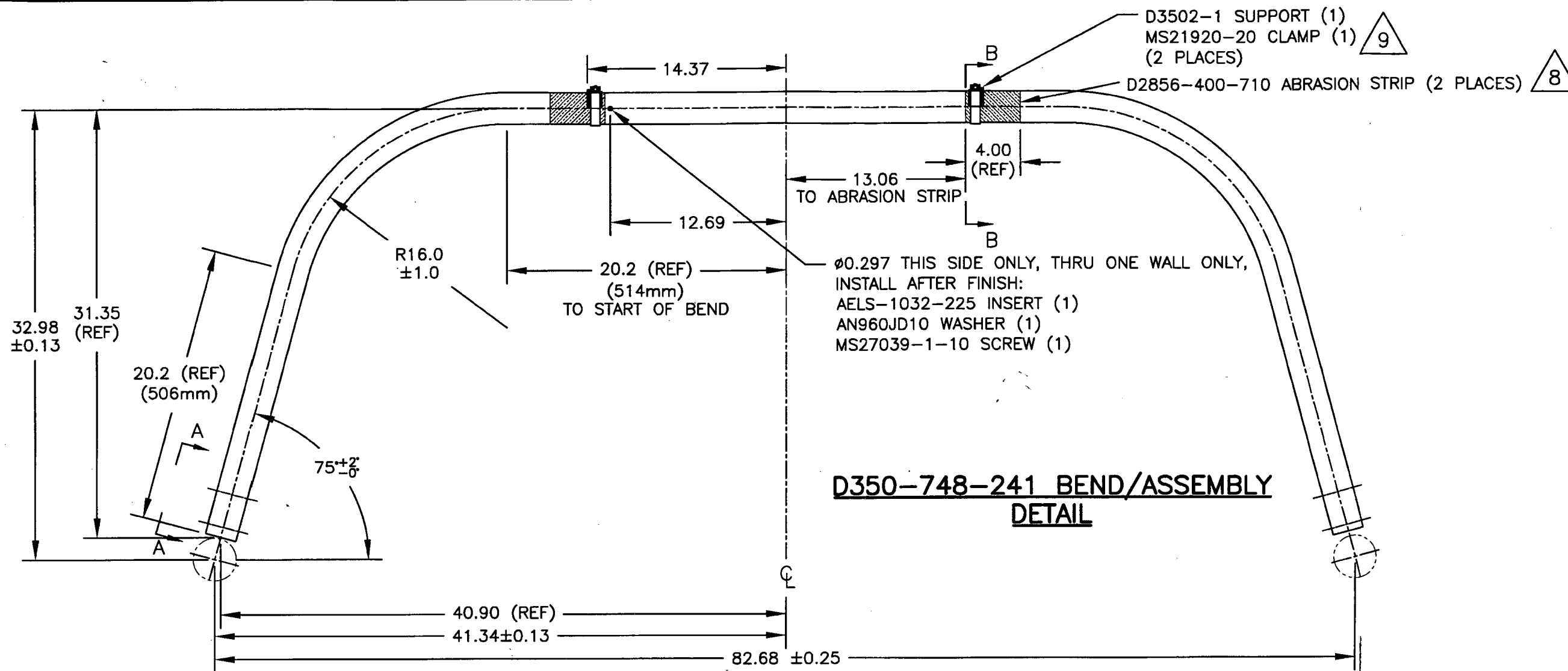
07.02/16

CUT FEM. REDUCED

OK 07.02.22

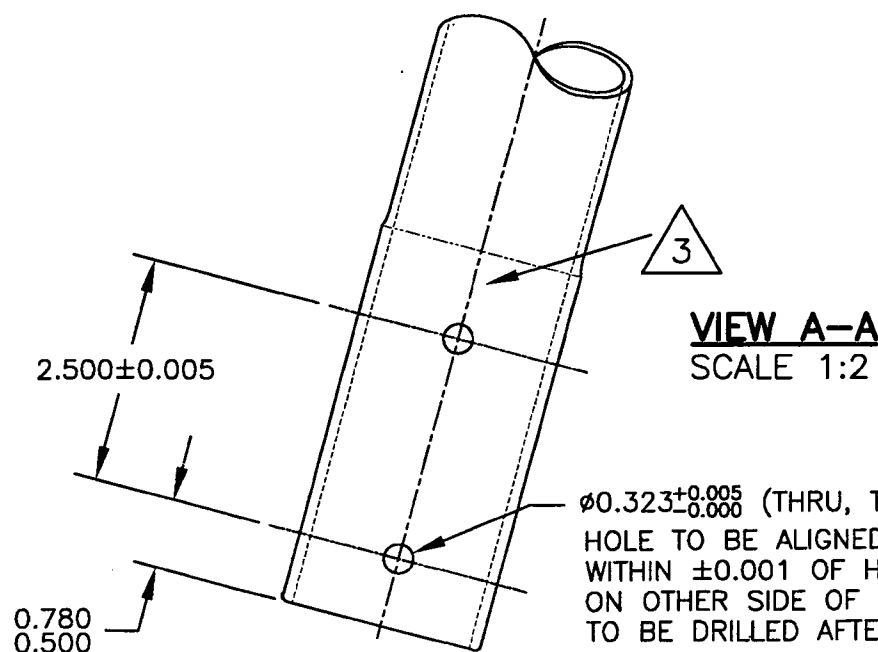
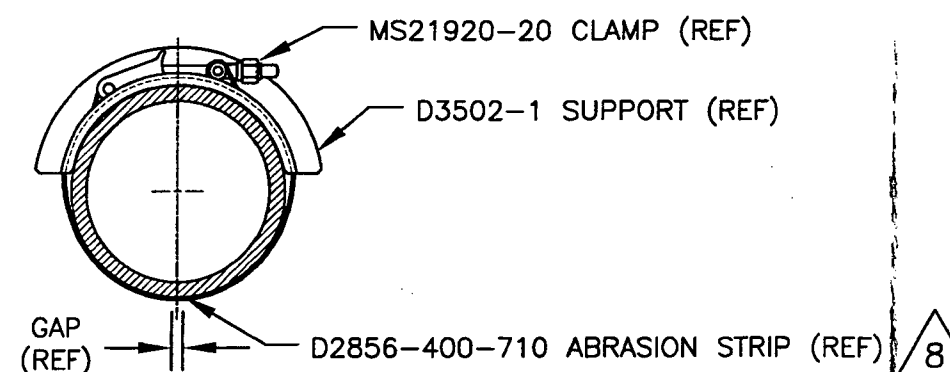
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D350-748-241 BEND/ASSEMBLY DETAIL

SECTION B-B SCALE 1:2



SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 44430

UNDER REVIEW

07.02/16/11
CUFF (P. 7.11.22)

RELEASED

06.10.31

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DESIGN

90

DRAWN BY

90

DART

DART AEROSPACE LTD.
HAWKESBURY, ONTARIO, CANADA

CHECKED

#

APPROVED

#

DRAWING NO.
D350-748-241

REV. D

SHEET 2 OF 3

DATE

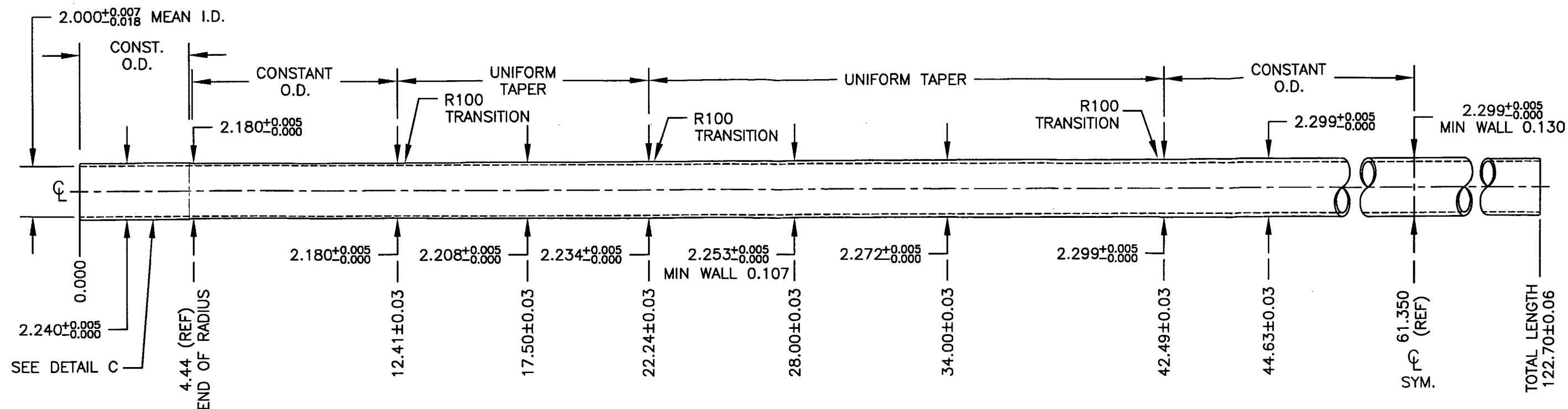
06.10.31

TITLE

CROSSTUBE (AS 350/355 HI AFT)

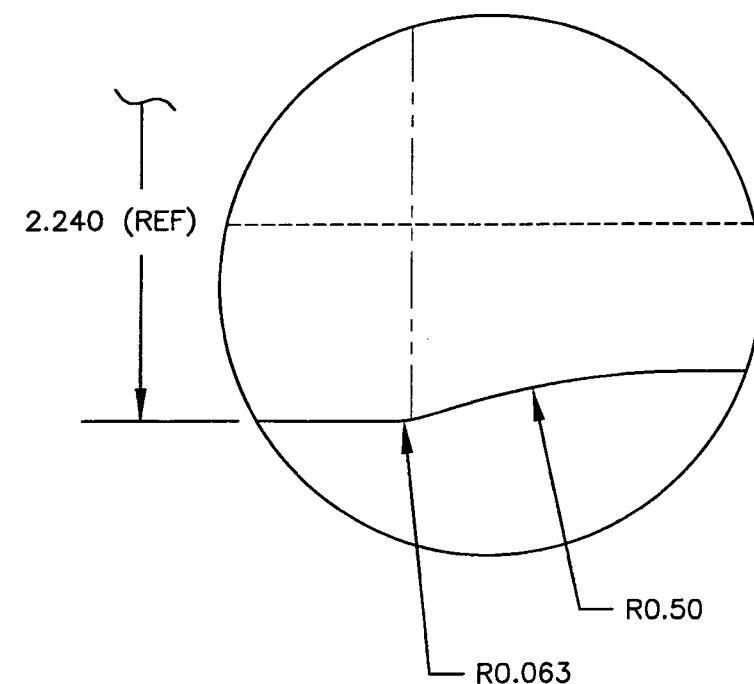
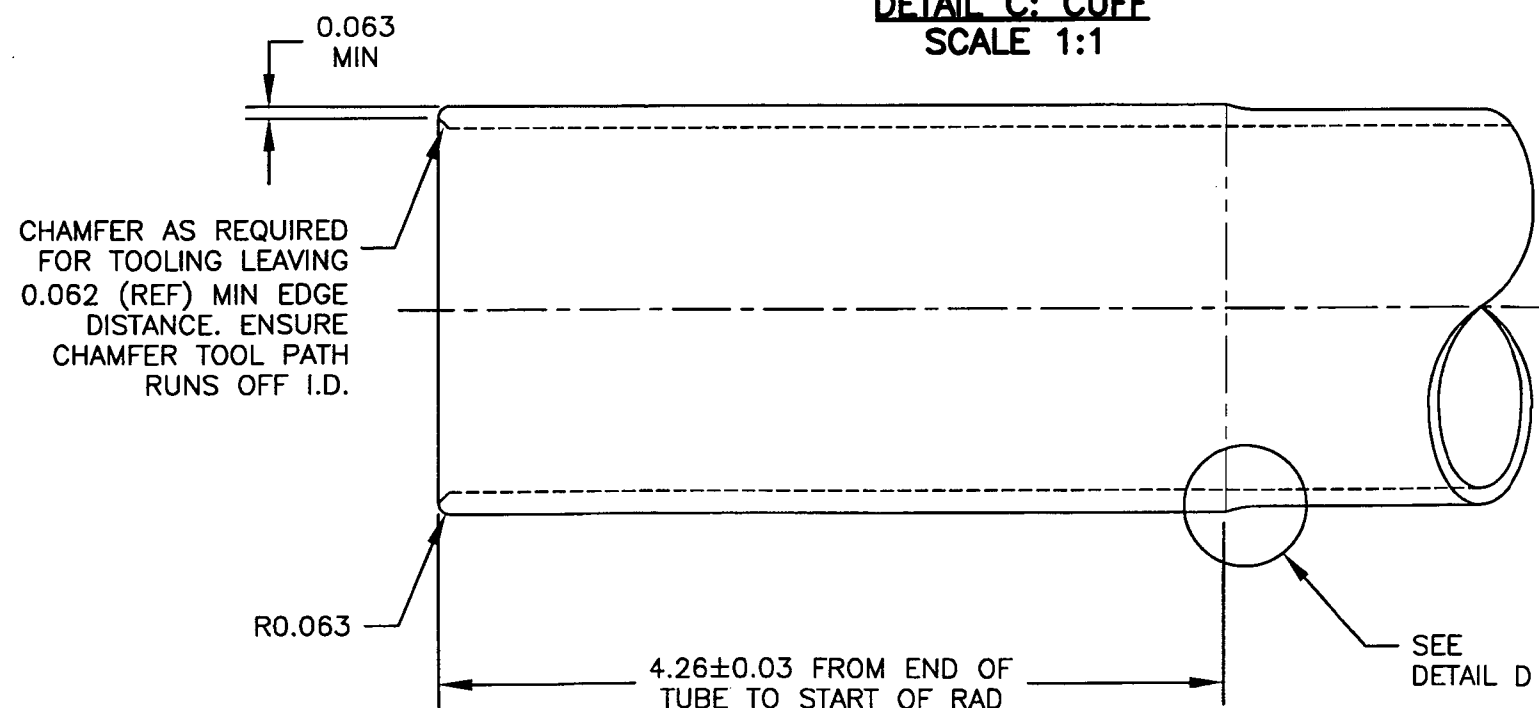
SCALE

1:8



D350-748-241 MACHINING DETAIL

DETAIL C: CUFF
SCALE 1:1



DETAIL D: CUFF TRANSITION
SCALE 9:1

RELEASED
06.10.31

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DESIGN 99	DRAWN BY 99	DART	DART AEROSPACE LTD. HAMPSHIRE, ONTARIO, CANADA
CHECKED [Signature]	APPROVED [Signature]	DRAWING NO. D350-748-241	REV. D SHEET 3 OF 3
DATE 06.10.31	TITLE CROSSTUBE (AS 350/355 HI AFT)	SCALE 1:4	

Date: Thursday, 10/07/2008 1:38:29 PM
 User: Julie Lecocq

Process Sheet

Customer : CU-DAR001 Dart Helicopters Services Drawing Name : X-TUBE AS 350/355 HI AFT UNDER REVIEW
 Job Number : 40414
 Estimate Number : 13225
 P.O. Number :
 This Issue : 10/07/2008 S.O. No. :
 Prsht Rev. : NC Part Number : D350748241TRN
 First Issue : / / Type : CROSSTUBES Drawing Number : D350-748-241 REV.D
 Previous Run : 40413 Drawing Revision : D
 Material :
 Due Date : 17/07/2008 Qty: 1 Um: Each
 Written By :
 Checked & Approved By : JULIE LECOCQ
 Comment : Est Rev:A New Issue 08-03-06 DD verified by:ec
 Est Rev B Removed polish 08.04.02 EC verified by : DD
 Est Rev C Removed LPS-3 08.06.23 Ec verified by: DD

Additional Product

Job Number:



SCRAP

Seq. #: Machine Or Operation: Description :

1.0 D6018125 Crosstube Material



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)
 Crosstube Material
 D6018-125
 2.299" OD X 2.000" ID
 Batch: 027472 a.m 08.07.14 (1)

2.0 MORI SEIKI MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Fill tube with sand & install plugs on both ends as per Folio FA647

2-Turn first side as per Folio FA647

3- File transition lines smooth. a.m 08.07.15 (1)

3.0 QC1 INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET a.m 08.07.15 (1)

4.0 MORI SEIKI MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Turn second side as per Folio FA647

2- File transition lines smooth. a.m 08.07.15 (1)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE AS 350/355 HI AFT UNDER REVIEW

Job Number: 40414

Part Number: D350748241TRN

Job Number:



Seq. #:

Machine Or Operation:

Description :

3-Scribe part # as per Dwg D350-748-241

5.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

6.0

QC8

SECOND CHECK



Comment: SECOND CHECK

7.0

OUTSIDE SERV.10

OUTSIDE SERVICES -skids



Comment: Sub-Contracting OUTSIDE SERVICES

Issue P/O: 7262

Heat Treat to min 180 KSI As per Dwg D350-748-241

Sand Blast tube after Heat Treat

Possible Supplier: Vac Aero

Ensure Certificate of Conformity is attached

8.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Receive & Inspect For Transit Damage

Ensure certificate of conformity is attached

9.0

QC6

DIMENSIONAL CHECK



Comment: DIMENSIONAL CHECK

10.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and stock in kanban rack

Location:

11.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



POSITIVE RECALL







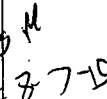






EFFECTIVE DATE

RELEASED DATE

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D350-748-241 PAR #: N/A Fault Category: Proo - X-tube NCR: (Yes) No DQA: HA Date: 08.11.25
Scrap / Scrap QA: N/C Closed: Date:

NCR: <u>40414</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
08/07/15	#6	During QC inspection employee DROPPED x-tube causing a dent about 0.250" long at 8.3125"		SCRAP TUBE. DENT 0.019 DEEP	 8-11-19	 08/07/15		 08/07/15
		From end of end tube. R.L. employee was pulling sand plugs out and x-tube slip off the rack. Lack of		Fabricate a clamping system for the racks to avoid the tubes from slipping, or falling off.	 8-7-15	 08/07/15		 08/07/15
		attention while he was working pulling the plugs out of another tube. Process		Identify the tube as "Scrap" by scribbling on the outside of the cuff.			 08/11/25	 08/07/15

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	40414
Description: Crosstube Assembly (AS350/355 High Aft)		Part Number:	D350-748-241
Inspection Dwg: D350-748-241 Rev: D		Page 1 of 1	

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article
 ☐ Prototype

Inspection Sheet Drawing Dimension		Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+0.005/-0.000	2.245	/			
	2.180	+0.005/-0.000	2.185	/			
	2.180	+0.005/-0.000	2.184	/			
	2.208	+0.005/-0.000	2.212	/			
	2.234	+0.005/-0.000	2.235	/			
	2.253	+0.005/-0.000	2.254	/			
	2.272	+0.005/-0.000	2.276	/			
	2.299	+0.005/-0.000	2.299	/			
	0.063	+/-0.010	0.063	/			
	4.26	+/-0.030	4.283	/			
	R0.063	+/-0.010	R0.063	/			
	R0.50	+/-0.030	R0.500	/			
SIDE B	2.240	+0.005/-0.000	2.245	/			
	2.180	+0.005/-0.000	2.185	/			
	2.180	+0.005/-0.000	2.185	/			
	2.208	+0.005/-0.000	2.212	/			
	2.234	+0.005/-0.000	2.236	/			
	2.253	+0.005/-0.000	2.253	/			
	2.272	+0.005/-0.000	2.273	/			
	2.299	+0.005/-0.000	2.299	/			
	0.063	+/-0.010	0.063	/			
	4.26	+/-0.030	4.290	/			
	R0.063	+/-0.010	R0.063	/			
	R0.50	+/-0.030	R0.500	/			
	122.70	+/-0.060	122.740	/			

Measured by:	a.m	Audited by:	ANM	Prototype Approval:	N/A
Date:	08.07.15	Date:	8-7-15	Date:	N/A

Rev	Date	Change	Revised by	Approved
A	07.01.17	New Issue (P/O D350-748-201)	KJ/JLM	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART**RELEASED**

06.10.31

DESIGN 90	DRAWN BY 90	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED H	APPROVED H	DRAWING NO. D350-748-241	REV. D SHEET 1 OF 3
DATE 06.10.31		TITLE CROSSTUBE (AS 350/355 HI AFT)	SCALE NTS
A	06.03.31	NEW ISSUE	
B	06.06.30	ADD D6018-125 & PRIME AND PAINT	
C	06.08.14	ADD CAD PLATING	
D	06.10.31	MAG. PARTICLE AND CAD PLATE AS MFD.	

QTY	P/N	DESCRIPTION
X	D350-748-241	CROSSTUBE ASSEMBLY (AS 350/355 HI AFT)
1	D6018-125	CROSSTUBE (OR D6015-125)
2	D3502-1	SUPPORT
2	D2856-400-710	ABRASION STRIP
1	AELS-1032-225	INSERT
1	AN960JD10	WASHER
2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
1	MS27039-1-10	SCREW

D350-748-141 CROSSTUBE:

- 1) MATERIAL: MANUFACTURED FROM D6018-125 OR D6015-125
FINISHED LENGTH = 122.70±0.06
- 2) MACHINE PER MACHINING DETAIL ON PAGE 3. BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITIONS SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 3) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 4) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 5) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING.
- 6) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 7) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 8) INSTALL D2856-400-710 ABRASION STRIP WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 9) TORQUE MS21920-20 CLAMPS 60 TO 80 IN-LB.
- 10) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 11) ALL DIMENSIONS ARE IN INCHES
- 12) PART IS SYMMETRIC ABOUT CENTERLINE EXCEPT FOR Ø0.297 HOLE.

UNDER REVIEW

07.02/16

CUT FOR REVIEW

OK 07.02.16

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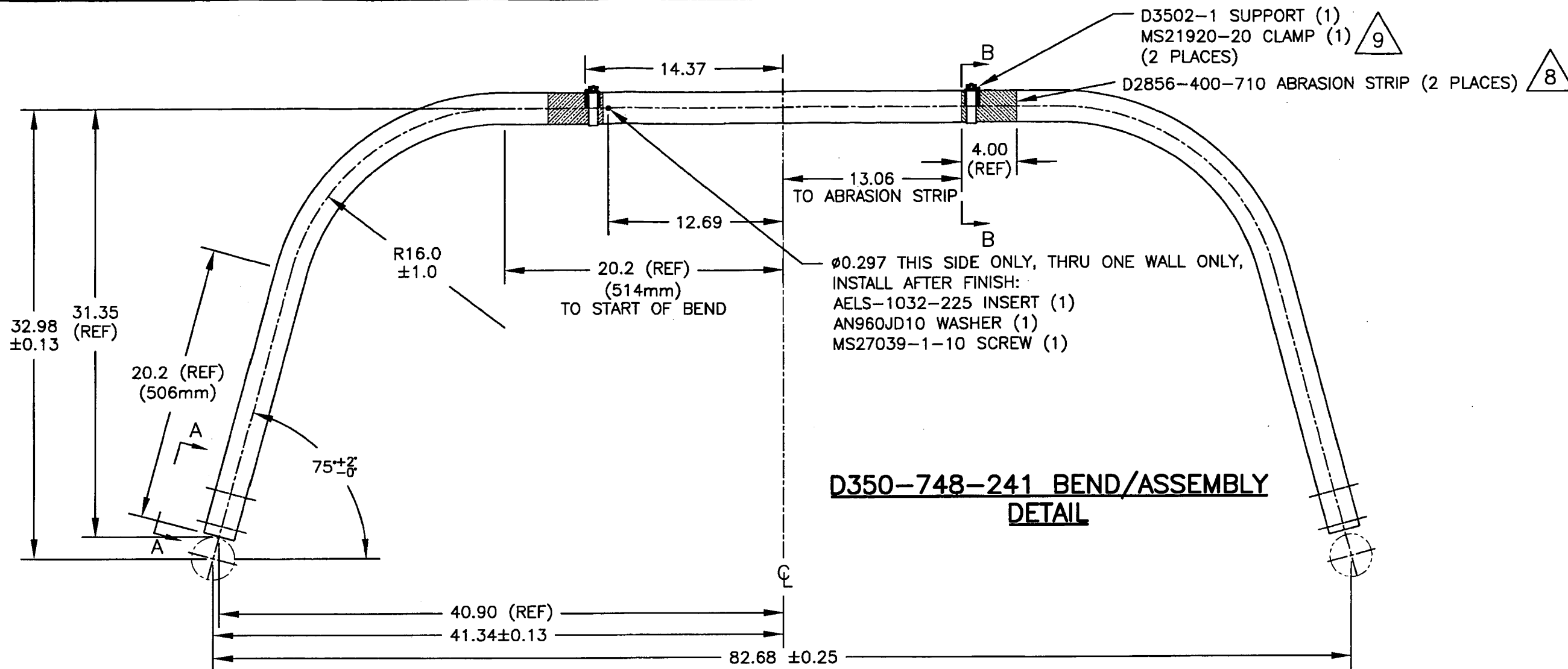
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

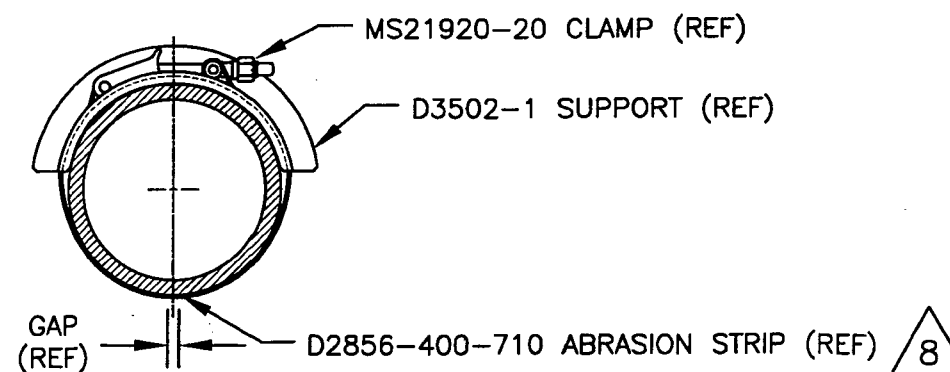
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

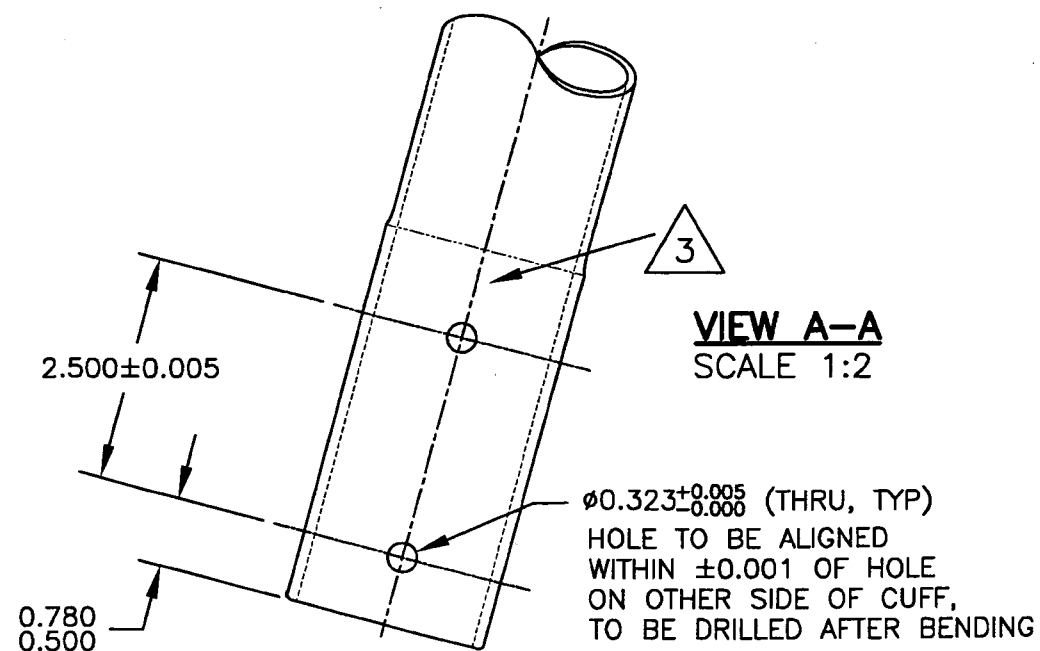


**D350-748-241 BEND/ASSEMBLY
DETAIL**

**SECTION B-B
SCALE 1:2**



**VIEW A-A
SCALE 1:2**



SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 40414

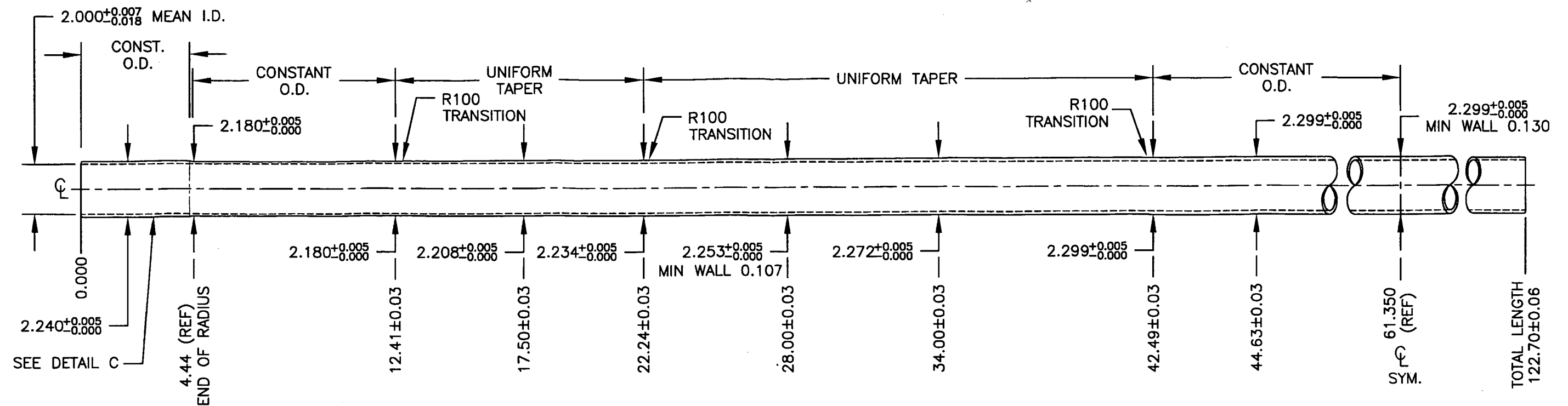
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07.02.16
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Ø 0.7.11.22

RELEASED
06.10.31

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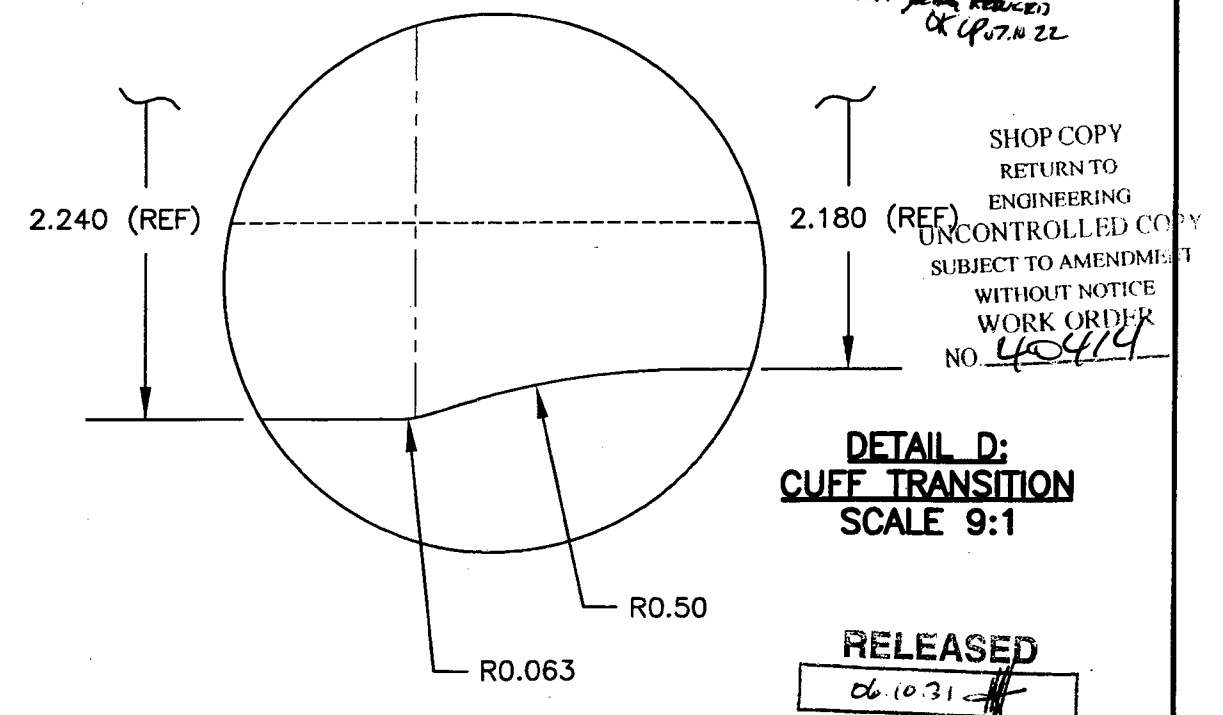
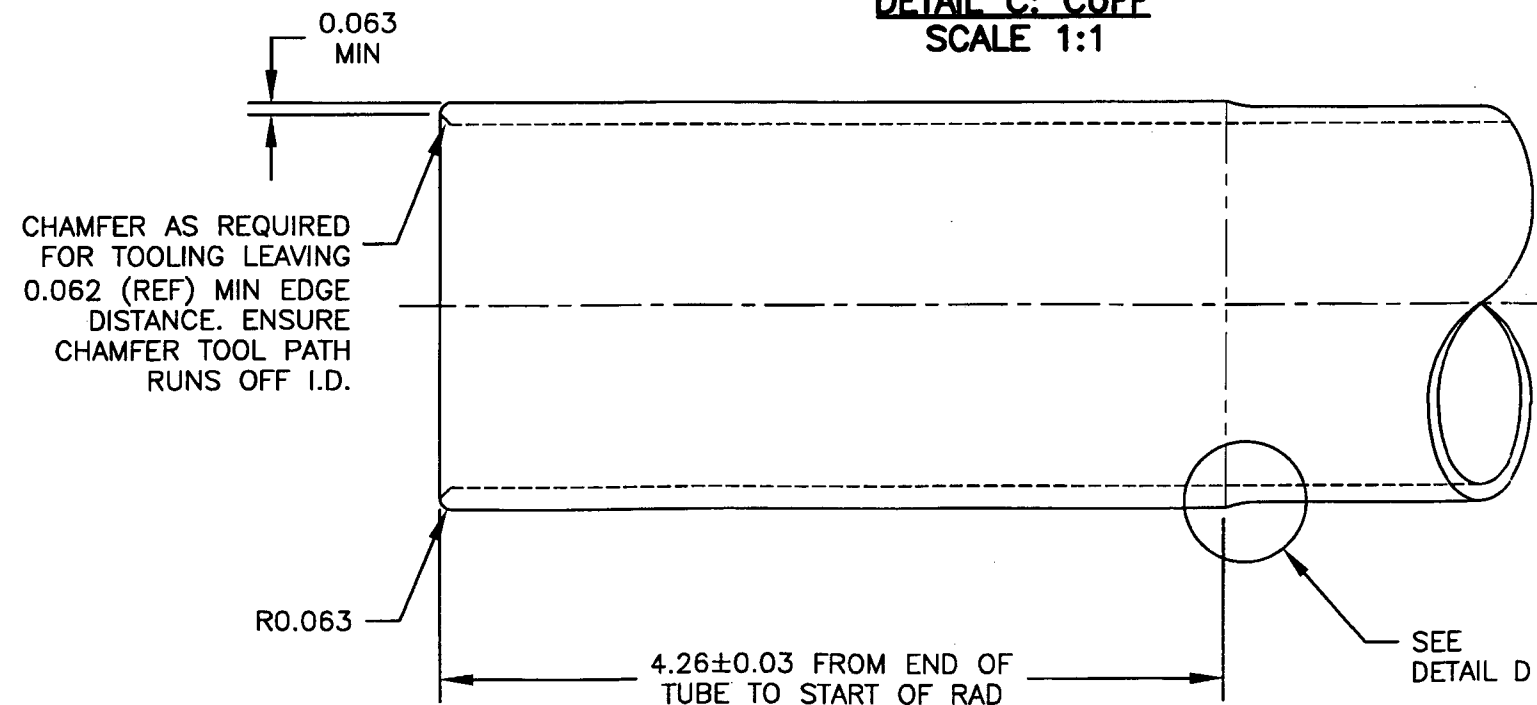
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DART AEROSPACE LTD.

DESIGN qp	DRAWN BY qp	DART	DART AEROSPACE LTD. HAWKESBURY, ONTARIO, CANADA
CHECKED H	APPROVED H	DRAWING NO. D350-748-241	REV. D SHEET 2 OF 3
DATE 06.10.31	TITLE CROSSTUBE (AS 350/355 HI AFT)	SCALE 1:8	



D350-748-241 MACHINING DETAIL

DETAIL C: CUFF
SCALE 1:1



**DETAIL D:
CUFF TRANSITION**
SCALE 9:1

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DESIGN qp	DRAWN BY qp	DART	DART AEROSPACE LTD. HAWKESBURY, ONTARIO, CANADA
CHECKED [Signature]	APPROVED [Signature]	DRAWING NO. D350-748-241	REV. D SHEET 3 OF 3
DATE 06.10.31		TITLE CROSSTUBE (AS 350/355 HI AFT)	SCALE 1:4



VAC AERO
INTERNATIONAL INC.

RELEASE NOTE

GST No. : R105468102

OAK 103192-4



HEAD OFFICE
1371 SPEERS ROAD, OAKVILLE, ONTARIO
CANADA L6L 2X5
TEL: (905) 827-4171 FAX: (905) 827-7489



2009 WYECROFT ROAD, UNIT B
OAKVILLE, ONTARIO
CANADA L6L 6J4
TEL: (905) 827-7377 FAX: (905) 827-1380



QUEBEC DIVISION
7450 RUE VÉRITÉ STREET, ST. LAURENT, QUÉBEC
CANADA H4S 1C5
TEL: (514) 334-4240 FAX: (514) 334-6269

11/14/2008

MM / DD / YYYY

PAGE : 1

1DAR01

BILL TO: DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

SHIP TO: DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

K6A 1K7

K6A 1K7

DATE SHIPPED	SHIP VIA	F.O.B.
11/14/2008		ORIGIN
CUSTOMER P/O No.	JOB No.	TERMS
00007262/ 7409		NET 30 DAYS

PART No.	DESCRIPTION	UOM	QTY ORD	QTY SHPD	TEST RESULTS
D350-748	-141 / -241	EA	11	11	
<p>Process Specifications: Procedure: 4353 HEAT TREATED TO 180 KSI MIN. PER AMS 2759-1D 100% HARDNESS TESTED AS PER ASTM E-18: 40-45 HRC GRIT BLASTED MATERIAL: 4130</p> <p>PO# PO00007262 4 PIECES D350-748-141: B40419, B40418, B40102, B40420 3 PIECES D350-748-241: B40110, B40413, B40414</p> <p>PO# PO00007409 4 PIECES D350-748-241: B42482, B42483, B42484, B42485</p> <p>NOTE: UNABLE TO FIND SERIAL NUMBERS ON PARTS</p>					

100% HARDNESS TESTED

11 pcs.

41/42 HRC



Solution

I hereby certify that the material covered by this release note has been inspected and tested and conforms to all specifications relevant thereto in accordance with the conditions of the contract / or purchase order.

ON BEHALF OF VAC AERO INTERNATIONAL INC.

Sandra Robinson
Authorized Q.C. Inspector



VACUUM BRAZING - HEAT TREATING - SPECIAL PROCESSING - FURNACE EQUIPMENT
TURBINE COMPONENT OVERHAUL - PLASMA AND OTHER COATINGS



Date: Thursday, 12/02/2009 11:09:02 AM
 User: Linda Lacelle

JOB HISTORY : DETAIL

Job Number	: 40414	Customer	: Dart Helicopters Services
Estimate Number	: 13225	DWG Name	: X-TUBE AS 350/355 HI AFT UNDER REVIEW
Purchase Order #	:	Part Number	: SCRAP11
Complete Date	: 21/11/2008 11:21:51	DWG Number	: D350-748-241 REV.D
		Rev.	: D

DUE DATE	ORDERED	DELIVERED
17/07/2008	1	0

1.0 D6018125-Crosstube Material INVENTORY ITEM

DATE	EMPLOYEE	TYPE	Qty		COST	
20/11/2008	FAUT01: Fauteux, Melanie	D6018125	1.000		\$100.19	Lot # 27472 Qty. 1

Subtotal:	QTD:	0	CTD:	1	\$100.19	
------------------	------	---	------	---	----------	--

2.0 MORI SEIKI Internal Operation

DATE	EMPLOYEE	TYPE	Qty	Time(hrs)	COST	MTime(hrs)	Mach.Cost	
11/07/2008	MYRE01: Myre, Alexandre	Run	0.000	0.16	\$2.59	0.49	19.56	
14/07/2008	MYRE01: Myre, Alexandre	Run	0.000	4.10	\$66.26	4.11	164.06	
15/07/2008	MYRE01: Myre, Alexandre	Run	1.000	1.37	\$22.14	1.37	54.69	

Subtotal:	QTD:	1	CTD:	0	5.63	\$329.30	
------------------	------	---	------	---	------	----------	--

7.0 OUTSIDE SERV.11 Sub-contr./External OP.

DATE	EMPLOYEE	TYPE	Qty		COST	
19/11/2008	LAVO01: Lavoie, Chantal	IN	1.000		\$65.00	

Subtotal:	QTD:	0	CTD:	1	\$65.00	
------------------	------	---	------	---	---------	--

		TIME	COST	
	Machine Time:	5.97	\$238.31	
	Labor:	5.63	\$90.99	
	Sub-contract (external Op.):		\$65.00	
	INVENTORY ITEM:		\$100.19	
	SUB-COMPONENT (SUB-JOB):		\$0.00	
Total:			\$494.49	

COST PER UNIT: \$494.49

Date: Thursday, 12/02/2009 2:10:22 PM

User: Linda Lacelle

JOB HISTORY : DETAIL

Job Number	: 40414	Customer	: Dart Helicopters Services
Estimate Number	: 13225	DWG Name	: X-TUBE AS 350/355 HI AFT UNDER REVIEW
Purchase Order #	:	Part Number	: SCRAP11
Complete Date	: 21/11/2008 11:59:59	DWG Number	: D350-748-241 REV.D
Rev.	: D		

DUE DATE	ORDERED	DELIVERED
17/07/2008	1	0

1.0 D6018125-Crosstube Material	INVENTORY ITEM
--	-----------------------

DATE	EMPLOYEE	TYPE	Qty	COST	
20/11/2008	FAUT01: Fauteux, Melanie	D6018125	1.000	\$100.19	Lot # 27472 Qty. 1
12/02/2009	LACE01: Lacelle, Linda	D6018125	-1.000	\$-100.19	Lot # 27472 Qty. -1
Subtotal:	QTD:	0	CTD:	0	\$0.00

2.0 MORI SEIKI	Internal Operation
-----------------------	---------------------------

DATE	EMPLOYEE	TYPE	Qty	Time(hrs)	COST	MTime(hrs)	Mach. Cost
11/07/2008	MYRE01: Myre, Alexandre	Run	0.000	0.16	\$2.59	0.49	19.56
14/07/2008	MYRE01: Myre, Alexandre	Run	0.000	4.10	\$66.26	4.11	164.06
15/07/2008	MYRE01: Myre, Alexandre	Run	1.000	1.37	\$22.14	1.37	54.69
12/02/2009	LACE01: Lacelle, Linda	Run	1.000	5.63	\$97.00	5.63	239.60
12/02/2009	LACE01: Lacelle, Linda	Run	1.000	-11.26	\$-194.01	-11.26	-479.20
Subtotal:	QTD:	3	CTD:	0	0.00	\$-7.31	

7.0 OUTSIDE SERV.11	Sub-contr./External OP.
----------------------------	--------------------------------

DATE	EMPLOYEE	TYPE	Qty	COST
19/11/2008	LAVO01: Lavoie, Chantal	IN	1.000	\$65.00
12/02/2009	LACE01: Lacelle, Linda	IN	-1.000	\$65.00
12/02/2009	LACE01: Lacelle, Linda	IN	0.000	\$0.00
12/02/2009	LACE01: Lacelle, Linda	IN	1.000	\$-130.00
Subtotal:	QTD:	0	CTD:	1
				\$0.00

	TIME	COST
Machine Time:	0.34	\$-1.29
Labor:	0.00	\$-6.02
Sub-contract (external Op.):		\$0.00
INVENTORY ITEM:		\$0.00
SUB-COMPONENT (SUB-JOB):		\$0.00
Total:		\$-7.31

COST PER UNIT:	\$-7.31
-----------------------	---------

Date: Thursday, 12/02/2009 2:15:23 PM

User: Linda Lacelle

JOB HISTORY : DETAIL

Job Number	: 44436	Customer	: Dart Helicopters Services LLC.
Estimate Number	: 12486	DWG Name	: 350/355 AS X-TUBE AFT
Purchase Order #	:	Part Number	: D350748201
Complete Date	: / / : : AM	DWG Number	: N/A
		Rev.	: D

DUE DATE	ORDERED	DELIVERED
30/01/2009	1	0

2.1 D6018125-Crosstube Material INVENTORY ITEM

DATE	EMPLOYEE	TYPE	Qty		COST	
12/02/2009	LACE01: Lacelle, Linda	D6018125	1.000		\$100.19	Lot # 27472 Qty. 1

Subtotal: QTD: 0 CTD: 1 \$100.19

2.2 MORI SEIKI Internal Operation

DATE	EMPLOYEE	TYPE	Qty	Time(hrs)	COST	MTime(hrs)	Mach. Cost	
12/02/2009	MYRE01: Myre, Alexandre	Run	1.000	11.26	\$181.96	11.26	449.45	
12/02/2009	MYRE01: Myre, Alexandre	Run	1.000	-5.63	\$-90.98	-5.63	-224.72	

Subtotal: QTD: 2 CTD: 0 5.63 \$315.71

2.3 OUTSIDE SERV.11 Sub-contr./External OP.

DATE	EMPLOYEE	TYPE	Qty		COST	
12/02/2009	LACE01: Lacelle, Linda	IN	1.000		\$65.00	

Subtotal: QTD: 0 CTD: 1 \$65.00

		TIME	COST	
	Machine Time:	5.63	\$224.73	
	Labor:	5.63	\$90.98	
	Sub-contract (external Op.):		\$65.00	
	INVENTORY ITEM:		\$100.19	
	SUB-COMPONENT (SUB-JOB):		\$0.00	
Total:			\$480.90	

COST PER UNIT: \$480.90

**CERTIFICATE OF
CONFORMANCE**

**CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1**

DATE: Mar-09-2009

**CONSIGNED TO: Dart Aerospace Ltd.
1270 Aberdeen St.
Hawksbury, ON K6A 1K7**

**W/O #: 84235
INVOICE #: 43414**

**CONTRACT OR
PURCHASE ORDER # PO00008213**

DESCRIPTION: SKID

QTY 1

P/N # D350-748-201

S/N # B44436

**STRESS RELIEF BAKE @ 375 DEG. FOR 5 HRS HEAT CHART
#10182. MPI INSPECTED IAW ASTM-E-1444. CADMIUM PLATED IAW
AMS-QQ-P-416B, TYPE 2 YELLOW, CLASS 2. BAKE HEAT CHART
#10219.**

**CERTIFICATE: I certify that the items indicated here on have
been inspected and tested and conform to all specifications
and requirements detailed on the contract or purchase order.**

Approved Inspector:



A handwritten signature in black ink, consisting of a large, stylized 'S' or 'R' shape with a horizontal line extending to the right.